Bridging the Distributor into a Collaborative Demand and Supply Planning Process

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PREVIEW Based on their study of the food distribution supply chain, Can Eksoz and Dilek Önkal argue that the distributor has largely been overlooked in the principles we've created for collaborative demand and supply planning. Their article re-inserts the distributor into the supply chain and examines the challenges of collaboration from the distributor's vantage point. This is a good lesson in how collaborative agreements must address the particular structures of the supply chain as well as the markets in which the supply-chain partners operate.

KEY POINTS

- Distributor companies are those that own the distribution and supply chain operations of manufacturers in specific markets. Both upstream (manufacturer) and downstream (retailer) actions can interfere with their demand and supply plans, and distribution centre (DC) and department-level uncertainties can aggravate their vulnerable landscape.
- To get the best possible inventory and service level performance in supply chains where a distributor coordinates the downstream supply chain from the manufacturing point onward, all parties (manufacturer, distributor, retailer) must accept their joint responsibilities and obligations and quickly communicate problems and issues.
- This article presents the foundations of an effective collaborative system among retailers, distributors, and manufacturers. The components are based on our industry experience and survey of food distributor companies, supplemented with our academic work on collaborative forecasting in food supply chains.

INTRODUCTION: OVERLOOKING THE DISTRIBUTOR

A plethora of research has been dedicated to Sales and Operations Planning (S&OP) for manufacturers, offering analysis for promoting better internal collaboration among departments. In parallel, Collaborative Planning, Forecasting, and Replenishment (CPFR) has become common practice for improved external collaborations.

Most of the research however has examined collaboration between manufacturers and retailers, while sidestepping distributors, even though distributor companies are often the first point of contact for retailers (Tang and Zhou, 2012). For products with short-shelf life or time-sensitive goods such as those in the food distribution supply chain (where the first author's expertise is) we are not aware of any studies in which distributors are in charge of the downstream supply chain.

THE DISTRIBUTOR'S CHALLENGES

Distributor companies are those that own the distribution and supply chain operations of manufacturers in specific markets. Because both upstream (manufacturer) and downstream (retailer) actions can interfere with their demand and supply plans, distributors operate in uncertain environments. In addition, Distribution Centre (DC) and department-level uncertainties can further disrupt their already uncertain supply chain. Here are some of the major challenges distributors face:

- Managing a portfolio of promotions across multiple channels (modern, traditional and wholesale trade)
- Trading with different margins
- Achieving cost-efficient demand and supply alignments
- Committing to the shipment targets of manufacturers while coping with varying shelf lives (for products sent by the manufacturer) and upstream lead times
- Dealing with previously-committed orders with limited stock due to late shipments, back orders by manufacturers, quality defects upstream of the DCs or unanticipated changes in market demand and shifts in product preferences downstream
- Achieving optimal stock between actual demand and contractual agreement with manufacturers, especially when combined with the risk of writing off expired inventory due to shelf-life limits
- Transporting late shipments from the manufacturers

These challenges can disrupt carefully-balanced demand and supply plans. They may lead to dangerously low levels of safety stock, and sometimes dictate product substitutions that reduce profitability. Balancing demand and supply when faced with these challenges necessitates negotiation and collaboration with both the internal departments and external partners who have interests in supply chain performance.

Distributors are not unique in needing to align internal "silos" to support top management's strategic vision or even in reaching consensus on a "single set of numbers" for the forecast. But they do have the unique challenge: how to extend their strategic visions and goals to the upstream and downstream levels. Enhancing strategic links to both streams is likely to lead to higher market share and competitive advantage. However, different organisational structures and profitability objectives of partner companies, along with varying forecasting and inventory management policies, can impede successful collaborations, forestalling synchronization of strategic goals within a unified demand and supply planning process.

Aligning supply and demand is challenging enough but becomes far more so in the case of dynamic environments involving short shelf-life or time-sensitive goods. The food industry hosts products with short shelf life, volatile and intermittent demands, necessitating intensive effort to retain product freshness while controlling availability on the shelves. Price volatility is another obstacle to matching supply and demand while achieving high customer service with reasonable profitability. Strong interdepartmental efforts are required to meet demands that are driven by promotions and to cope with erratic market demands while managing newly launched items.

OUR SURVEY OF DISTRIBUTORS

The collaborative framework proposed below stems from the first author's field experience and survey data collected from 20 food distributors in the Middle East (United Arab Emirates, Turkey and Cyprus). Our fieldwork with food supply chain companies in these countries shows that balancing demand and supply in the midst of upstream and downstream partners poses a major challenge to food distributors. Volatility continues to be an important handicap to anticipating demand and coordinating supply; while DC and department-level conflicts appear to be important barriers to information sharing and effective communication. In what follows, we propose a structure that places distributors at the heart of a collaborative

demand and supply planning process to achieve a better performance for all food supply chain partners.

COLLABORATIVE FRAMEWORK WITH DISTRIBUTORS

To get the best possible inventory and service level performance in supply chains where a distributor coordinates the downstream supply chain from the manufacturing point onward, all parties (manufacturer, distributor, retailer) must accept their joint responsibilities and obligations and quickly communicate problems and issues.

John Mello observed (2015) that, in order to build strong collaborations in a competitive landscape, partners should not only synchronize demand and supply through sharing of information and development of joint agreements, but also should build trust in and commitment with each other. In those organizations that succeed in the alignment of supply and demand and achieve these conditions of trust, we have observed several policies and behaviours:

*Market analyses are jointly derived and updated, with mutually agreed upon demand plans and replenishment schedules.
*There is collaborative demand planning and agreements on replenishment plans with the other supply chain partners
* Internal silos are aligned with a single vision defined and enforced by top management

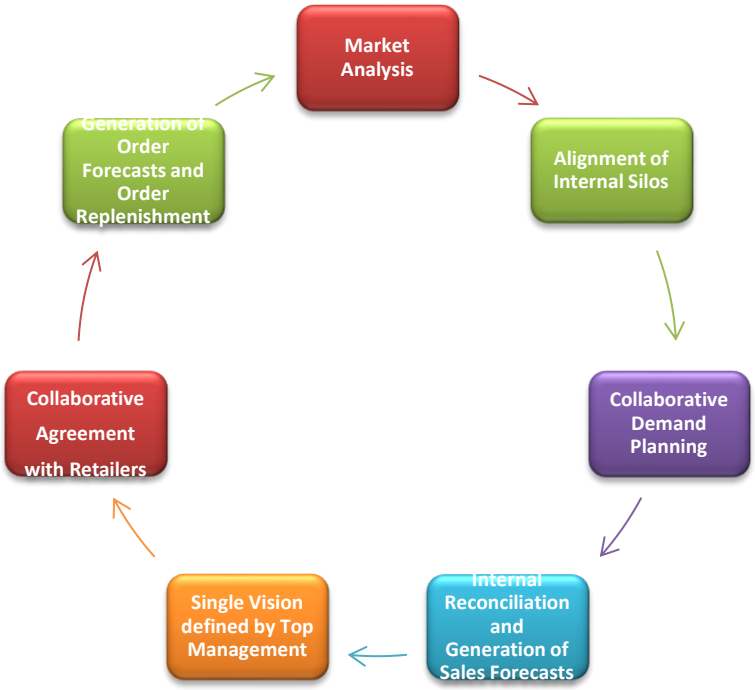

Figure 1. Collaborative Framework

These foundations of an effective collaborative framework are portrayed in **Figure 1**. To begin, in managing short-shelf life and time sensitive food products, partners must make timely updates to market analyses, resulting in jointly derived and agreed upon demand plans and replenishment schedules. Systems and processes must also be in place to ensure aligned objectives, rules of engagement, and update frequency. Without such a complete structure for supply chain collaboration, whatever good work that might be done in initial market analysis and replenishment schedules will remain tenuous and unsustainable.

Market analysis should provide an understanding of product characteristics, consumer behaviours, and the external factors affecting demand.

Alignment of Internal Silos is needed for all departments -- sales & marketing, inventory, supply, demand planning, and finance -- to have common Key Performance Indicators (KPIs) and to avoid internal conflicts.

Collaborative demand planning encompasses the generation of statistical forecasts and application of judgmental adjustments, while ensuring the outcome will fit into the overall business-planning cycle.

Internal reconciliation seeks to mold a single plan out of the information provided by marketing, supply, inventory, and finance.

Top management must ensure that all departments proceed with a single vision.

The collaborative agreement with partners should define the extent of collaboration, common objectives and KPIs, the details of information exchange and forecasting procedures.

Generating a single forecast remains one of the biggest challenges for supply chain partners, but enhanced communication and information sharing will promote consensus. The **generation of order forecasts** based on "inventory target per product" and "product destination" will help the distributor manage inventory and distribution operations more effectively.

Following the order forecasts, **retailer order replenishment schedules** must be established and continuously reviewed.

The following sections elaborate on the components of the collaborative model.

MARKET ANALYSIS

Distributors typically operate in different geographical markets from those of their manufacturers, a collaborative concern when it comes to working jointly on issues requiring market insights for specific countries or regions. Differences in geographical expertise, consumer acumen, and market volatilities all contribute to a clash of expectations between distributors and manufacturers.

Understanding the market is crucial not only for accurate forecasting, effective supply planning, and inventory optimizing, but also for achieving robust relations with supply chain partners. All partners need a good understanding of customers and products and policies on how to respond to changes in behaviour patterns, competitors' actions, and external factors.

Accordingly, we recommend gathering and dissecting such information on a monthly basis. This can require intensive effort, so formalizing the structure of retailers, product characteristics, competitors, end-consumers, and external factors into a *segmentation model* could prove highly beneficial. For instance, retailers can be categorized based on trade, and then filtered based on region, and finally retailers' DCs/stores where products are shipped. Similarly, external factors can be categorized as known vs unknown. As illustrated in Table 1, a segmentation model, enhanced with surveys of end consumers, will help the distributor to generate demand-driven forecasts and to apply judgmental adjustments based on market insights.

Segmentation Model

Retailer	Trade	Region	To	Product Type
A	Modern	X	15 Stores	Food, Non-Nood
A	Traditional	Z	4 Stores	Food
B	Modern	Y	5 DC	Food, Non-Nood
B	Groceries	Z	6 Stores	Food
C	Traditional	X	3 Stores	Food, Non-Nood
C	High Frequency Stores (HFS)	Y	4 DC	Food, Non-Food
D	Groceries	X	5 Stores	Food, Non-Nood

External factors affecting forecasts

Factors	Known	Unknown
Holidays	√	
Our Promo Plan	√	
Weather		√
Competitor's Promo Plan		√
Economic Stability		√
Tax / VAT	√	

Table 1. Illustration of Segmentation Model

ALIGNMENT OF INTERNAL SILOS

Distributors confront internal difficulties stemming from manufacturers' long and variable lead times, but also due to poor internal-departmental communication, multiple forecasts and contradictory KPIs. Such situations are particularly severe when handling short shelf-life and time-sensitive products (Eksoz and colleagues, 2014) and can damage their relations with retailers. For instance, a slowdown in the distributor's flow of products that results in empty store shelves could give rise to contractual penalties to be paid to retailers.

A distributor must have complete, real-time information on shelf lives at DCs and full visibility of inventory volumes. It will be beneficial to extend this visibility to retailers' stock so as to be able to accelerate speed-to-store and ensure freshness on the shelves. Accuracy of inventory records both at DC and retail store level is likely to provide substantial contribution to the partnership, while being a prerequisite for efficient utilisation of DCs.

COLLABORATIVE DEMAND PLANNING

Collaborative demand planning requires pre-established procedures for forecasting methodology, aggregation levels, and consistency with strategic goals. The key input here is the types of information to be shared, including past sales volumes, previous forecasts and forecast errors, seasonality factors, geographical information, past promotions, and other relevant customer-level data.

For most distributors in the food sector, forecasting methodology encompasses a portfolio of bottom-up techniques (where the channel/customer-level sales forecasts are aggregated into an overall sales forecast) and top-down methods (where the overall sales forecast is broken down into individual forecasts for each channel based on historical performance and growth targets). For instance, while bottom-up approach helps capture channel/customer-level volatilities for a brand through aggregation of forecasts, top-down approach ensures realistic and achievable disaggregation of forecasts for each channel or brand for sustainable growth. Benefitting from the segmentation model given above, such a portfolio approach enables crosschecking the forecasts across different segments and facilitates sensitivity analyses under diverse scenarios.
When it comes to newly-launched products, both the manufacturers' sales plans and historical analogies (past performance with similar products) play important roles until sufficient data can be gathered.

Customer-level data are a key input into the statistical forecast models but requires the distributor to pay careful attention to manufacturer-level metrics on lead-times, production and shipment issues, Minimum Order Quantities (MOQs) and more. These metrics are critical for distributor forecasting performance if the distributor lacks visibility upstream.

Judgmental adjustments to statistical forecasts can add value when based on important information not included in the statistical forecasts (e.g. special events, weather conditions; Goodwin (2005)). For instance, one of the regional food distributors we worked with experienced a significant improvement in forecast accuracy from negative adjustments to the statistical forecasts of their fresh-food portfolio (3-30 days shelf life) based on imminent weather conditions.

Sharing the reasons for applying adjustments also enhances forecast accuracy and improves communication across departments/collaborators (Önkal and colleagues, 2012). We know

that salespeople may deliberately inflate or deflate forecasts to ensure supply or exceed quotas (Mello, 2009), and departments/collaborators may have different motives so exposing this habit in collaborative teams may be expected to reduce forecast bias and increase accuracy.

INTERNAL RECONCILIATION AND GENERATION OF SALES FORECASTS

Augmenting the demand plan with the information provided by marketing, supply, inventory, and finance would help reconcile departmental objectives, which could then be translated into an operational plan. Sales and marketing need to follow a product-focused view to accommodate promotions, newly launched products, substitutions, and/or discounts into the plan. Then, supply and inventory departments share distribution-related constraints, excesses or shortfalls of inventory, and how well existing inventory meets demand. Last minute changes in production, supply problems causing delayed arrival of orders, region level MOQs including neighbouring market demands or back order problems are some of the critical items

> *When it comes to improving the demand plan, the unique contribution of supply and inventory departments is to merge upstream-level information gleaned through strong relations and communication with manufacturers*.

that the distributor must merge into the demand plan.

Reviewing the strategic long-term goals and success levels attained will help with finessing the demand plan. It would be beneficial for finance departments to share cost information along with financial expectations on a regular basis to keep all collaborators in tune with the changes and required modifications.

Reaching an agreement on a single forecast is probably the most challenging node in the collaboration process, primarily because of the divergence in forecast horizons between

retailers and distributions. Retailers stress the importance of frequent shelf replenishment with small orders while distributors are likely to request extended time horizons to handle long lead times, which depends largely upon the location of manufacturers that finished goods are provided. Both sides need to develop a shared understanding of the forecasting context in addition to the potentially conflicting priorities and constraints.

Furthermore, since retailers seek to replenish frequently with minimum stock levels, they make many short-term decisions in which judgmental adjustments may be necessary to enhance forecasts (Syntetos and colleagues, 2015). Forecast adjustments for promotions and special events could be essential for internal reconciliation.

If there are circumstances preventing partners from agreeing on forecasts, it might be useful to report multiple scenarios of alternative paths for future demand. Doing so may not only improve partners' rapid reaction to instant demand changes, but also propel customer-driven strategies, in turn reducing costs and increase customer service.

SINGLE VISION DEFINED BY TOP MANAGEMENT

After finalizing the consensus demand plan, the team should present it to the top management. For distributors, the involvement of top management in the collaborative process goes beyond that of providing high-level commitment and motivation for personnel. Top management must see where the plan stands and determine what more should be done to achieve the strategic goals agreed upon among supply chain partners, especially those related to long term sales volumes and profitability. It should ensure that all departments are in line with the plan and offer a single vision to bond all partners within a unified plan that recognizes all constraints but protects divergent interests.

After the approval of top-management, the team should be ready to unify their demand plan with the retailer through external collaborations.

COLLABORATIVE AGREEMENT WITH RETAILERS

While the level of partnership developed between different supply chain partners plays a critical role in the agreement of a joint plan (Eksoz, 2017), a strong bridge must connect

partners' sales and operations. Accordingly, a collaborative agreement between distributors and retailers must account for factors at both the upstream and downstream levels. These factors include variable lead-times, manufacturing defects, short shelf-life shipments by manufacturers, logistical problems, and delays during offloading at the DC level.

The partners must establish a common rationale for cooperation, trust, availability of resources, and required technological platforms, as well as agree upon common objectives (mutual KPIs).

and the types and frequency of information to be shared on the brand/product-family or SKU in the demand plan.

The initiation of the collaboration between distributors and retailers is quite different from that between manufacturers and retailers. Manufacturers and retailers tend to agree upon the extent of their collaboration at the outset of their relationship. For the distributor, however, the timing of the collaborative arrangement will vary with the brand/products in question. In other words, the distributor needs to decide *when* a collaborative agreement is required depending on the prior decisions made for *which brand and which products*, and with *which retailer,* and under what conditions. Thus, acceptable response times and other details for coordinating forecasts need to be fully clarified in the collaborative agreement. This enables order and delivery commitments to be scheduled and is essential for coping with changing demand in a fast-paced environment.

Partners must then resolve potential disagreements based on procedures identified during collaborative agreement, and publish a front-end agreement, which includes objectives and KPIs of the partnership (Siefert, 2003), as well as forecast horizons for each item to be forecast. For example, if partners collaborate on seasonal products and long production lead

times, a long planning horizon is more beneficial (e.g. 12 months), while a short horizon may be adequate for short lead times and mature products (Grimson and Pyke, 2007).

GENERATION OF ORDER FORECASTS AND ORDER REPLENISHMENT

Supply chain partners need to share information on inventory levels and delivery schedules, needed for the generation of a retailer order forecast. Estimating order quantities based on "inventory target per product" and "product destination" will help partners to manage inventory and distribution operations effectively. Throughout the whole process, partners must continually inform each other with updates on market, delivery and products.

Order forecasts agreed upon by the partners enable all partners to create replenishment schedules (for the manufacturer, retailer, the distributor at RDCs and DCs), leading to a truly collaborative supply chain. The distributor for example may take into account the retailer's warehouse-level buffer stock, manufacturer's shipment plan, and DC-level outbound operations to split the demand plan to conform to daily, weekly, or monthly replenishment schedules. The role of marketing, supply, and inventory is crucial to the creation of a successful replenishment schedule. Marketing goes over the exact dates of promotions, the launching of new items, and the price discounts. Supply and inventory departments then scrutinize the inventory levels, lead times, and transportation capacity/constraints.

After the alignment of replenishment schedules, partners need to flesh out the implications for their operational plans and KPIs. They must track progress on a regular basis and explore potential shortfalls that need to be remedied.

SUMMARY

Our main objective in this article has been to describe the key elements of collaborative demand and supply planning when distributors interact with manufacturers and retailers, especially in environments where the products have short-shelf lives demands are volatile. In

contrast to manufacturing companies, distributors' demand and supply plans are influenced not only by upstream and downstream factors but also by DC- and department-level uncertainties. Building collaborative bridges to tackle the uncertainties may be the only viable way of attaining the targets across all supply chain partners.

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